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ORIGINAL ARTICLES.

THE PHYSIOLOGY OF ARTICULATION.

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Until within recent years, the domain of medicine has consisted only of those organs upon which the animal life and health depend. Modern therapeutics and, more especially, modern surgery, have enlarged this field by the development of new specialties, so as to include the care of the special senses, the correction and prevention of even minor deformities, and other means to the enjoyment rather than the mere maintenance of life. In all these acquisitions, anatomical and physiological research has cleared the ground for the fruitful results of practice, whether medical or surgical.

The study of speech production is one in which the grammarian and rhetorician, the physicist, and the physician all ought to be interested. The first has, with some exceptions, perpetrated and perpetuated the most glaring errors in discussions of this subject; the second has, in the person of v. Helmholtz, brought the study to a state of relative perfection so far as its acoustics are concerned; the last rarely has given any attention to it, but has considered the matter—if at all—in a purely empirical light. Notwithstanding, therefore, this paper has no immediate and specific application in view, it seems well to call attention to the abstract scientific facts which must underlie any advance in the practical care of organs upon which depend in large measure the development of the high state of civilization in which we live, and which constitute the most ready distinction between our own and other species of the brute creation.

The organs of speech are the respiratory apparatus, and the mouth, including the palate, teeth, tongue and lips. The muscles of respiration, with the lungs, bronchial tubes, bronchi, and trachea may be grouped together and dismissed with brief consideration. Their only function in the production of speech is to furnish a stream of air, and their place might be filled by a bellows with the necessary power and connections. Next in anatomical order is the larynx, with the vocal chords, and the various muscles which determine their tension, and, therefore, the pitch of the voice. In whispering, the vocal chords are not used at all, their function being supplied by the walls of the pharynx

and mouth, which vibrate feebly, yet sufficiently to produce an audible substitute for the laryngeal voice.

The organs thus far considered are those of voice rather than of speech. Voice bears to speech the same relation which marble bears to a statue. Speech without voice would be as much of an abstraction as is a figure which has no material expression. But voice is no more truly speech than is mere marble sculpture. Voice is fashioned into speech by the modifications which its vibrations receive as they pass through the pharynx, mouth, and nose, and it is, therefore, only with these cavities and their contained structures that we have to deal. But before proceeding further, it is necessary to review some of the principles of acoustics and phonetics upon which the physiology of speech is based.

Sounds differ from one another in intensity, pitch, and quality; the first depending on the distance from crest to trough of the acoustic waves—the larger the wave, the louder the sound; pitch, on the rapidity with which the waves follow one another—the more frequent the vibrations, the higher the note; while quality depends, according to some authorities, upon the shape of the waves; according to other and better authorities, upon the pitch of secondary accompanying waves which may be called harmonics or overtones.

Intensity and pitch we need not consider further, for speech is speech, whether carried on in a shout or in an undertone, by the shrillest soprano or by the deepest bass. There can be no doubt that certain differences of quality by which we distinguish one sound from another are due to overtones, for an acute ear or a resonator can detect them. That certain differences are due to a variation in the shape of the sound-wave without reference to the variation which would be produced by a secondary wave running along the surface of the main wave, is, at least, not proven.

By phonetic analysis, speech is reduced to about sixty-four elementary sounds, thirty-six of which are found in the English language—more than in almost any other tongue. It is hardly necessary to state that our spelling, with twenty-six letters to fulfill the purpose of thirty-six, is only approximately phonetic. It has been said that the purpose of speech was to disguise our thoughts. English spelling succeeds in misleading all who have not given the subject special study, as to the actual sounds which represent the spoken word. Few, for example, will admit without considerable argument that *wh* is pronounced *hw;* or that *J* represents —or misrepresents—two elementary sounds, *D* and a second (heard in ozier) for which we have no constant or even approximately constant method of representation in print. Few languages can rival English in the simplicity and regularity of its inflections; none is so uniformly logical in its construction. Not even the vaunted Greek can approach the English in its capacity to express delicate and sharply-defined verbal ideas. None is so thoroughly depraved in its spelling. It is not within the province of this paper to suggest a reform. Any genuine improvement of our spelling must be on lines so radical as to necessitate the creation of an almost new alphabet. The uselessness of attempting to accomplish anything of consequence with our present alphabet must be apparent when we consider that, with a deficit of ten letters to begin with, we deliberately waste two, *J* and *X*, in representing consonantal diphthongs (*D*, *Zh*, and *Ks*, respectively), and two more, *C* and *Q*, in duplicating methods of representing *K* and *S* sounds. It must be borne in mind throughout the present discussion that the actual phonetic analysis of a word has no necessary connection with the accepted spelling.

Theoretically, the number of elementary sounds, like the possible positions of the various parts of the articulating apparatus, is infinite, but music makes no nicer distinction of pitch than the semitone, so in our analysis we shall consider only such simple sounds as are readily distinguished by an ear of average acuteness.

Elementary sounds are divided primarily into two great classes—vowels and consonants. The former are tones capable of prolongation, limited only by the capacity of the lungs; the latter are, as their name implies, audible only when sounded with a vowel, and are not tones in any true sense, but consist of

more or less complete stoppages or deviations of the current of sound. Like other natural phenomena, the simplest sounds cannot be rigidly classified, but as some chemical elements are at times basic and again acidulous in their function, so there are phonetic elements which combine the qualities of vowel and consonant.

VOWELS.

Call to mind the sounds represented by the following list of words:—*pop, caw, rustle, groan, coo, patter, peck, drip, squeak.* The imitative element of these words is the vowel, and the very existence of such a class of words shows that non-articulate sounds bear a greater or less resemblance to vowels, the shrillest or highest pitched sound being represented by *E*, the lowest by *OO*, while those of intermediate pitch, correspond to other vowels. We may conclude from this that vowels owe their individuality to a difference in pitch, and, as we have already noted that the pitch of the voice, produced in the larynx, has nothing to do with speech, the differentiation between the vowels must lie in the pitch of the overtones. These vowel overtones are not, as one might suppose from the use of the term in music, relative in pitch to that of the primary tone of the voice, but are absolute and vary within narrow limits. In other words, in speaking we have the power to strike an overtone of a certain rapidity of vibration, although few of us can reproduce at will a tone of a given pitch. By the aid of resonators some of the harmonics have been determined, and, though there is some disagreement, the vowel sounds may be quite accurately represented by the following scale:—

OO—F of the bass staff,
Oh—Bb of the treble staff,
Aw—Eb " " "
Ah—Bb above the treble staff,
A (as in at)—F an octave above the highest line of the treble staff,
E (as in yet)—C two octaves above that of the treble staff,
A (as in hay)—D one note higher than the last,
EE (as in see)—G three octaves above G of the treble staff.

An ear of moderate delicacy can detect these vowel overtones in the piano notes, though it must be remembered that the pitch of any instrument, and especially of a piano, is apt to be somewhat above the standard of technical acoustics.

The vowels may be classified into three groups, the overtones of the first forming a descending series from *Ah* to *OO;* those of the last series ascending from *A* (as in at) to *EE;* while, between the two and related to both, is an intermediate group difficult of pronunciation on account of a peculiar, affected sound. The writer has for some years regarded the vowels of this series as combinations of vowels of each of the other groups, and, therefore, as analogous to musical chords. In this view, he has found himself at once anticipated and confirmed by v. Helmholtz, except that the latter does not mention the sound of A in ask, which is not heard in the German.

Vowels.			
Ah	ä	ă	
AW		ai	
Uh	ö	eh	Liquids.
Oh		ā	R L
oŏ	ü	ĭ	
oō		ē	
W	W	Y	—Semi-vowels.

Through all three columns runs a distinction into pairs of closely related "long" and "short" vowels, which distinction is readily appreciated by the ear but by no means so readily explained. Certainly, the words "long" and "short" are misnomers, for the difference is one of quality, not of time.

Vowel harmonics, like the voice, have their limits of high and low pitch. At these limits, the quality of the vowel becomes almost consonantal, giving us *W* and *Y* sounds and, at the end of the series of composite vowels, a sound which is a simultaneous utterance of *W* and *Y*. A vowel preceded by *W* or *Y*, is like a diphthong beginning with *OO* or *EE*, except that the overtone is, so to speak, flatted for *W* and sharped for *Y*. If therefore, we represent a diphthong by a slur in musical notation, a vowel preceded by *W* or *Y* is like a note introduced by a grace-note.

As physiologists, we are interested to know by what apparatus vowels are produced. Helmholtz and other very excellent authorities locate this function in the larynx, but this is disproved by the

following observations: (1) In articulating vowels, the sense of effort is felt in the muscles of the lips, cheeks, tongue, and pillars of the fauces, not in the larynx. (2) Vowels can be pronounced in a whisper, in which case the larynx is not in use, except that the stream of air passes through it. (3) In cases of paralysis, or even of complete removal of the larynx, the patient is still able to articulate vowels, though the voice is lost. (4) Conversely, if the pharynx or mouth is so altered by disease or by operation as to change the shape and size of either of these cavities to a considerable extent, the power to articulate vowels is absolutely lost, though many or all of the consonantal sounds may still be produced. The combined cavity of the pharynx and mouth may be compared to an organ pipe, and it is a well-known acoustic law that, other things being equal, the pitch of a tone varies inversely as the length of the pipe in which it is produced. In the articulation of the descending series of vowels, the tube consists of the whole length of the oro-pharyngeal cavity, which is adjusted to the resonance of different vowels by the action of the muscles of its walls. The cavity is sensibly made longest for the articulation of *OO*, while, in its natural state, with the muscles nearly relaxed, it is in the position for the production of the sound *Ah*. We thus find a physiological explanation for the universally recognized fact that this is the simplest of vowels and worthy of heading the alphabets of almost all nations.

In the third or ascending set of vowels there is, as we approach *EE*, a greater and greater tendency to shorten the resonant cavity by approximating the back of the tongue to the hard palate. The difficulty of pronouncing the intermediate series is accounted for by the necessity of maintaining two resonant cavities, one of which is included in the other.

SEMI-VOWELS, LIQUIDS, OR LINGUALS.

This class consists of only two radically different sounds, though several varieties of each have been recognized. They are called liquids on account of their resemblance to the sounds of water when agitated; linguals because the tongue is the organ most essential to their formation; semi-vowels because either may form a syllable without any true vowel, or may perform the function of a consonant.

The vocal use of *R* is mainly confined to the English language, wherein it is very frequent in such words as *fur*, *curd*, etc., in which the vocal sound is most emphatically not that of short *U*, certain grammarians to the contrary. *L* forms in English the vocal part of unaccented syllables alone, as in *auricle*, *quarrel*, etc. In some Eastern languages it is used in accented syllables also.

R is produced by the vibration of the air passing between the back of the tongue and the palate, while the base of the tongue is held firm. *L*, on the other hand, is formed by pressing the tip of the tongue against the roof of the mouth just behind the front teeth, while the air escapes around the sides of the tongue. In heart disease, a leaflet of a valve, resembling the tongue in shape, may be held, sometimes with the tip comparatively loose, sometimes with the tip bound down by adhesions, so that as the blood current sets it in vibration, *R* or *L* sounds may be produced.

CONSONANTS.

Consonants are divided into fricatives or sibillants, and explosives or mutes. The former are produced by the friction of the air in passing through a narrow aperture; the latter by a sudden and absolute stoppage of the current, followed by an almost instantaneous removal of the obstruction. The latter are normally imitated in the closure of the valves of the heart, the former by leakages in case of disease of the cardiac valves. With another principle in view, consonants are divided into pairs, consisting each of a sonant and a surd, a distinction corresponding somewhat to the division of vowels into long and short. According to whether the muscular contraction which checks the air current is firm or lax, the vibration produced is between narrower or broader limits, and the consonant is a surd or sonant, respectively. We may refer to another analogy presented by the heart. The muscular walls of the ventricles vibrating with the closure of the lower or auriculo-ventricular valves, produce

a sonant sound—an expression which, in this connection, is not tautological. On the other hand, the upper or semilunar valves are attached to the tough and thin origin of the main arteries leading from the heart, so that the closure of these valves occurs with a snap comparable to the formation of a surd consonant. In German, final mutes (as in *Brot* or *Brod*) are pronounced with a quality midway between that of a sonant and a surd.

We have already divided consonants independently into fricatives and mutes, and sonants and surds. It remains to classify them according to the location of the obstruction to the air current. We recognize, therefore, three groups: (1) Labial or Anterior; (2) Dental, Lingual or Mesial; (3) Palatal, Guttural or Posterior.

Consonants.										
	Labials.		Linguals.		Palatals.					
Sonant	B		D		G	} Mutes.				
Surd	P		T		K					
	Labio-Dental.									
Sonant	m	V	Th	Z	Zh	m	m	ꝺ	} Sibillants.	
Surd	Φ	F	Th	S	Sh	Ly	Ly	H		

Most European languages recognize only three pairs of mutes, produced as indicated in the table. The Russians have labio-dental mutes, corresponding to the fricatives V and F, and the (Asiatic) Indian dialects contain mutes corresponding to all the sub-divisions of the Mesial and Posterior groups of fricatives. It is difficult for an untrained ear to differentiate between the various mutes of any one of these groups. The writer has not been able to find that the sonants corresponding to the German *Ch* sounds exist in any civilized language. He has heard them used as exclamations of disgust by a German. The Greeks have been almost alone in recognizing the smooth breathing as a consonant. The reason that it seems to us the absence of a consonant, is that it is produced by the vibration of the walls of the fauces when in a relaxed condition, and, therefore, being always present unless an effort is made to the contrary, it is difficult to appreciate it as an entity. The guttural produced lower in the throat, is represented by the Spanish *X*, and is not heard in Northern countries except in the effort to clear the throat. It is significant that, in opposition to the tendencies which soften the voices of inhabitants of warm climates and make their speech rich and mellow, there is lacking the necessity of avoiding guttural sounds for the sake of protecting the throat from cold air. In general, it is to be observed that the inhabitants of cold countries favor those sounds which shall open the mouth as little as possible. Although on account of our Germanic descent, we cannot contrast the English with the German and Scandinavian languages so as to illustrate this point very clearly, it is to be noticed that the peculiar accent of the latter people is an effort in this direction, the muscles of the mouth holding it "on guard," so to speak, while an Englishman or an American attempting to pronounce the same sounds, does so in what we may call a loose-mouthed fashion.

THE NASAL ELEMENT.

In the utterance of the elementary sounds thus far considered the breath passes out through the mouth, the nose being entirely shut off by the action of the palatal muscles. This fact can be demonstrated either by holding a small mirror in front of the nostrils and noticing that no film appears on it, or by stopping short with the parts in the proper position for any of the mutes, when the mouth will become distended with air. The writer would ascribe this action to the following muscles: the levator palati, aided perhaps by the stylo-pharyngeus, pulls the velum palati upward and backward, while the palato-pharyngeus closes the aperture by constriction. The tendon of the tensor palati, winding around the hamular process, opposes both the former actions and thus opens the passage to the nose from behind.

The nasal element is produced by vibrations in the posterior nares. It may be added to any phonetic sound, but it forms characteristic combinations only with the vowels and the mutes. It should be noted that the nasal vowels do not lose their peculiar overtones but have others added to them. For example, we recognize that the French word *bon* has the same vowel tone as *beau* (bo), yet we appreciate a differ-

ence which is not consonantal in the ordinary sense, since the nasal sound does not precede nor follow the vowel tone but is synchronous with it. Beside the four nasal vowels of the French, any other vowel may be nasalized, as occurs in the indolent mispronunciation of some country districts in which the twang is due to the failure to close the posterior nares. Those unfortunate individuals who have a cleft palate, are unable to speak without a constant nasalizing of the elementary sounds of speech.

The three nasals corresponding to the mutes are *M N Ng*, being formed like *P T K*, respectively, except that the breath, instead of being stopped in its course, is bent backward and escapes through the nostrils. On account of this devious route we are not able to distinguish between surd and sonant nasals. During a severe cold in the head, the posterior nares are so swollen and congested that they vibrate very feebly and, thus, the intended nasals remain almost as simple mutes. Such a phrase, for example, as "The moon shines dimly," becomes "The bood shides dibly," with the merest suspicion of nasals.

It would be of interest to discuss in detail the elementary sounds mentioned in the table, to allude to the phonetic changes which have occurred in the development and decay of languages, and to those which illustrate the wanderings of a word originally the same through the various members of the Aryan group of dialects. A paper could be written on the mere suggestion that the nasal Ng occurs almost never as an initial, or on the absence of short vowels from monosyllables in English and their frequency in Greek monosyllables. These matters, however, cannot be discussed in the present paper.

SUMMARY.

Speech is a very complex function. There is, first, the laryngeal voice or the whisper, rising at each accent, falling or rising with the inflections, varying in intensity from moment to moment according to accent and emphasis—which latter is to the sentence what accent is to the word; secondly, the vowel overtones, covering a range of four octaves, blending with yet absolutely independent of the pitch of the voice; lastly, the consonants, which we may compare roughly to the effects produced by the stops of an organ. And the whole apparatus is so thoroughly under the control of the involuntary centres of the brain, its use so automatic, that only the occurrence of some unfamiliar word or of some phonetic element unknown to our language, causes us to bestow a thought upon it.

Military Temperance in India.

The remarkable influence of the Army Temperance Society in India in improving the physical and moral health of the soldiers is brought out very forcibly in the statistics for 1894–5, collected by the secretary from Adjutant-General and officers commanding corps in India.

Trials by Court-Martial.—Convictions of abstainers, 94; of non-abstainers, 2,131. The number of abstainers having been 20,675, and of non-abstainers, 49,758, the convictions were therefore per 1,000 among the abstainers, 4.54; among non-abstainers, 42.82, or nearly ten times as many convictions per 1,000 of the drinkers as of the non-drinkers.

Number Summarily Punished for Insubordination.—Among abstainers, 69, or 48.86 per 1,000, as against 4,610, or 92.84 of non-abstainers.

Convictions for Minor Offences.—In the three months ending March 31, 1895, the entries in twenty-six corps among abstainers was 22.2 per 1,000; among non-abstainers, 99.7 per 1,000. General Dandridge, in recommending separate temperance canteen tents on the line of march, stated that one regiment he inspected in 1885 at Umballa had 175 courts-martial, with £300 fines for drunkenness in one year; next year 37, with a proportionate decrease in the fines. This good effect, added the General, was the result of upwards of 400 of the men having joined the temperance societies.

Health.—In these twenty-six corps during the six months ending March 31, 1895, the admissions into hospital per cent. were: of abstainers, 6.6; of non-abstainers, 12. We need hardly point to the obvious moral of the great finance and efficiency values of temperate soldiers.—*B. Journ.*

A YEAR OF ANTITOXIN.

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Antitoxin was first brought to the notice of the medical profession during the last half of 1894. It is therefore possible at this time to review the experience of the first year of its use, and by a comparison of the published statistics and opinions concerning its results, to ascertain with some degree of accuracy the present status of the remedy in the minds of the medical profession at large.

As to the claims of antitoxin, no one is better qualified to speak than Behring himself, who, more than any other, is its originator. "I am now definitely of the opinion," he writes, "that under suitable treatment with my remedy the mortality from diphtheria may be reduced under five per cent., if the serum is used in good time—that is, before the third day of illness. * * * The serum may be used with success after the third day; but it cannot be too often repeated that this can only be the case when a multiple of the ordinary dose is given, when the danger to life is due to the diphtheritic process, not to infection with other matters, and when further immediate danger from obstruction of the respiratory passages is relieved by tracheotomy or intubation."

In the light of this clear statement of the claims of the method by its author, let us examine the statistics of its results in hospital and private practice.

In the Willard Parker Hospital, in Boston, from January 1 to May 1, 1894, there were treated 211 cases of diphtheria by the usual methods, with a mortality of 39 per cent. For the corresponding period of 1895, 255 cases were treated with antitoxin, with a mortality of 28 per cent. Of laryngeal cases requiring intubation, thirty-six cases were treated without antitoxin, with four recoveries; while fifty-three cases were treated with antitoxin, with nineteen recoveries. Of laryngeal cases not requiring intubation, there were four deaths in thirteen cases treated without, and four deaths in eighteen cases treated with antitoxin. A further analysis shows that out of fifty-nine cases not involving the larynx, in which treatment was begun within the first three days, only four died—a mortality of 6½ per cent.—while in ninety-five such cases admitted after the third day, the mortality was 22 per cent.

In the Boston City Hospital, for the first forty-five weeks of 1894, under the usual treatment the mortality from diphtheria was 42 per cent.—which was less than the average for the preceding four years,—while during the last seven weeks of the year, when all the cases which were deemed likely at the outset to be severe were treated with antitoxin, the mortality was reduced to 21 per cent., and in those cases in which the serum was actually used, to 17 per cent.

Dr. William H. Welch, in a valuable paper in the *Johns Hopkins Hospital Bulletin*, gives a summary of 7,166 cases treated with antitoxin, with a mortality of 17.3 per cent. At least five-sixths of these were in hospital practice, where the ordinary rate of mortality is in the vicinity of 50 per cent. He also shows that in 814 cases, in which treatment was begun before the third day, the percentage of deaths were only 5.5 per cent.

Prof. Van Ranke, of the University of Munich, states that in his clinic the mortality from diphtheria for eight years prior to September 24, 1894, the date of the introduction of the serum treatment, ranged from 46 per cent. in 1893, to 57 per cent. in 1894; while from September 24, 1894, to July 1, 1895, under the new treatment the mortality was 17.7 per cent.

Reports from Germany of 10,312 cases of the disease, show 5,833 cases treated with the antitoxic serum, with a mortality of 9.6 per cent., and 4,479 cases treated without the serum, the mortality being 14.7 per cent.

In the various children's hospitals in New York City, antitoxin has been used very successfully as a means of prevent-

ing the disease in persons who had been or were about to be exposed to its contagion. The immunity thus produced is not permanent, but lasts for a variable period, usually about thirty days. In 1,014 cases thus immunized, there were only three cases of diphtheria occurring within thirty days thereafter, although the conditions were the same under which, during the ninety days preceding immunization, 225 cases of the disease had occurred. By this means it was therefore found possible to stamp out diphtheria completely in a number of great institutions in which it was prevailing in a more or less epidemic form.

The statistics of private practice are more difficult to obtain, owing to the comparatively small number of cases treated by any one person, and also to the reluctance of the general practitioner to report his cases. But so far as can be gathered from the reports scattered here and there in the medical journals, the results have been even more favorable, comparatively, here than in hospital practice, while the actual percentage of deaths under either method of treatment is much less.

To clearly comprehend the theory upon which the use of antitoxin is based, let us glance for a moment at the general subject of immunity, or freedom from the liability to certain infectious diseases. A natural immunity exists in certain species of animals and in single individuals of a species, rendering them insusceptible to particular diseases. The same natural immunity is supposed to exist in some individuals of the human race, as no amount of exposure is capable of producing in them certain of these diseases; as for example, small-pox or measles. Acquired immunity is the insusceptibility to a second attack, in persons who have successfully passed through one attack of an infectious disease. It may be of a longer or shorter duration. The theory is that the tissues are exhausted of the pabulum on which that particular germ thrives. This form of immunity was formerly produced artificially in the case of small-pox, by innoculating healthy subjects with the virus of genuine small-pox, whereby a comparatively mild and less dangerous attack was induced and full immunity from future attacks secured.

But Jenner discovered that an attack of kine-pox, a different and much less serious though similar disease, was equally effective in protecting from small-pox, and substituted vaccination for innoculation—a trifling affection for one which, even in the modified form induced by innoculation, was dangerous and sometimes fatal.

The next step was taken by Pasteur, who discovered the possibility of modifying the virulence of a specific disease by a system of gradual attenuation of its virus, thereby lessening its activity without changing its nature. This he applied to the treatment of anthrax, hydrophobia, and some other diseases. His own statement of his theory is as follows: "To exhaust a soil, a parasite less vigorous and destructive than the really virulent one may suffice; and if, after having by means of a feebler organism exhausted the soil without a fatal result, the most highly virulent parasite be introduced into the system, it will prove powerless."

This system, while productive of very beneficial results, was yet attended with some degree of danger, on account of the pathological disturbances inevitably produced by the introduction of these weakened bacterial cultures into the system. The new disease thus produced, though much milder than the one which it supplanted, was yet not entirely devoid of danger.

But now a new path was blazed in the wilderness of bacterio-therapy. We owe to many observers, but notably to Raux and Behring, the discovery of the fact that there are formed in the blood of persons recovering from the specific infectious diseases, substances which antagonize the poison of the disease, and thus lead the way to recovery. Further investigation showed that if blood-serum containing these substances be injected into the blood of subjects suffering from the disease, its course is thereby arrested and a cure effected, provided the constitutional effects had not proceeded too far, and also that a similar injection in healthy subjects confers a temporary immunity from the disease. Whether this result is due to chemical or vital action is not yet definitely settled, but the weight of evidence decidedly sustains the vital theory, namely, that the anti-

toxin acts through the agency of the living body, and probably by rendering the cells tolerant of the poison. This system of treatment, which is known as serum-therapy, has been wrought out more fully in the case of diphtheria than of any other disease, but is already being experimented with in numerous other diseases, with every promise of brilliant results in due time.

From a review of the statistics given, and also of the published opinions of prominent investigators, the following conclusions are drawn:

1. Small doses of antitoxin will produce temporary immunity, lasting about four weeks; and for this purpose it should always be used in cases of an outbreak of the disease in public institutions, or in families where one member is attacked and absolute isolation is impracticable. This seems likely to prove one of the most important uses of the remedy.

2. Used in larger doses, and duly repeated according to necessity, it will arrest the progress of the disease, clear the throat of membrane, and unless serious constitutional effects have already resulted, will produce a speedy cure. But it will not antagonize septic poisoning, nor restore degenerative changes resulting therefrom. Therefore in order that it may be relied upon to produce recovery, it must be used early in the course of the disease, the earlier the better; while if deferred until late in the progress of the case, it may prove without avail. Whether it lessens the frequency of heart, nerve, and kidney complications, seems to depend entirely upon the period when it is used. The time of its greatest usefulness is generally placed at the first two or three days, but in reality is measured, not so much by the day of the disease as by the extent of the septic poisoning and resulting degenerative changes.

3. It cannot be too often repeated that antitoxin is in no sense a germicide, and it produces no effect upon the bacillus of diphtheria, which may persist in the throat for days and even weeks after recovery has taken place following the injection of the serum. For this reason it does not supersede the older measures of antisepsis and isolation in the treatment of the disease.

4. There are no toxic properties in antitoxin as such. But considered as a foreign substance, the blood-serum of the horse, when introduced directly into the blood and tissues of the human system, may, and often does, produce disagreeable and unpleasant symptoms in the shape of urticaria and other exanthems, and occasionally elevation of temperature, swelling of the joints, and cutaneous hyperæsthesia. Mr. Lennox Browne, one of the ablest laryngologists of Great Britain, considers that it creates "an increased liability to the most grave complications of diphtheria, viz., anuria, nephritis and cardiac failure," and on this and other grounds, he does not feel justified in recommending the use of antitoxin. His experience is at variance with that of the large majority of observers, however, most of whom agree that the essential harmlessness of the serum has been demonstrated by more than one hundred thousand injections.

5. Taking all cases reported together, the practical result of the first year's use of antitoxin, so far as can be judged at the present time, has been to lessen the death rate from diphtheria in cases where it has been used, nearly or quite one-half, thus proving itself beyond all doubt to be the most successful of any known treatment for this dread disease. It is confidently predicted that the results will be even more favorable the second year, owing to improvements in the methods of preparing, preserving, and administering the serum. There is also every reason to anticipate that the same success which now attends the treatment of diphtheria by the serum method, will soon be attained in the cases of a number of the other specific diseases.

PAPA—Why, Bobby, where is your new gold watch that you got for Christmas? Bobby—Oh, I swapped it with a boy down the street for some chewing-gum, a dime and a white mouse, and its all right, 'cos he's a very nice honest boy, and he said if my father didn't like it he'd exchange again, and he gave me his name and address. Papa—Tell me what they are immediately. Bobby—He said his name was John Smith, and that he lived in the Bowery.—*Harper's Bazar.*

TINEA VERSICOLOR.

J. ABBOTT CANTRELL, M.D.,* PHILADELPHIA, PENNA.

Of the vegetable parasitic affections of the skin it is possible that tinea versicolor is the least understood by the practitioner, both as regards the disease itself and its treatment.

Numerous causes have been assigned for this curious phenomenon. It has been asserted that it is a constant accompaniment of affections of the lungs and especially of pulmonary phthisis, and that it has even caused consumption, but it is my opinion that neither of these assertions will hold ground, as tinea versicolor is seen just as often in those of robust constitution as it is in those of weaker frame. Disease of the uterus has been alleged as a *fons et origo*, and alike have diseases of the liver been described as the producing cause, hence the appellation "liver spots," but unfortunately for these conjectures, neither have anything in common with this parasitic affection, and thus may be cast aside as unworthy of consideration.

It is possible that malnutrition of the skin as well as an overabundance in the excretion of sweat may, to some extent at least, influence its production. But the true cause of its appearance is the deposit of a certain fungus upon the cutaneous surface. Whether this fungus will affect the part and thus multiply itself depends upon certain facts which may possibly be rather obscure, as it is a well-known fact that certain persons are not susceptible to favus, or to one of the animal parasitic affections, pediculosis, because they do not possess the proper soil suitable for their action and growth.

Beginning, as the disease does, in a single point, it is likely to spread until great portions of the trunk are involved, and while in the greater majority of the cases the disease is confined to the chest and back in their median lines, it is likely to spread to other portions of the trunk and extremities, such as the neck. In some rare instances it has been seen upon the face, as in the case recorded by Biart, of Nebraska, (*Journal Cutaneous and Venereal Diseases*, 1885, vol. iii, p. 73), which was witnessed in a finger-nail-sized patch on the left cheek; and the case of Payne, which showed the fungus upon scales taken from the scalp and beard, but in which case the disease had been present upon the chest for several years. I myself have repeatedly seen cases in which the affection had spread from the chest and back to cover the entire trunk; in some cases in small but numerous lesions; in other instances where a number of these lesions had coalesced and formed a large area of disease; and, in still others, I have found it to occupy the portion just mentioned and to have spread to the arms, and, in a number of instances, even to the legs. These cases of extensive involvement are rare, but for diagnostic purposes it is to be remembered because of the similarity that may be affected by this disease to other skin affections, or that may be assumed by others.

As first seen, the disease is generally found to occupy some extent of surface, and not very early in its evolution. Because, as a rule, the affected person does not know of its existence until long after contagion has taken place, and then the appearances are likely to differ slightly from what it would if seen early. According to the statistics of the American Dermatological Association, for the period from July, 1877, to January, 1893, there were observed 2324 cases in a total of 204,866, or a percentage of 1,13 for the disease. Thus showing that while the disease is apparently rare, there are enough cases to cause one to make some study of the condition. These figures certainly do not show the entire number of cases of this affection which are present in our country, but they give a comparative prominence to the manifestation.

Clinically speaking, the assertion may

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be made that tinea versicolor is confined to the anterior and posterior portions of the trunk, and in the median line, as a rule. It may often be found elsewhere, as above cited.

It is found in patches, few or many, occupying the diseased area; either in small, discrete, rounded, macular lesions, which may vary in size from a half pea to a bean in ordinary cases. These may never coalesce, remaining as separate lesions scattered here and there over the affected area, but as a general rule we find them forming large patches by conjunction with others in the immediate neighborhood. Whether the distribution is in small or large patches the affection has points of predilection, and may be found in the greater majority of instances to be much worse upon the anterior portion of the trunk and in its uppper half. Should there be a possible coalescence, one may notice small islets throughout the apparently unaffected portions. The lesions do not hold to any particular form, but it will be noticed in some cases that the patch is round, or in others oval, with apparently distinct borders, while in others it will fade somewhat in color toward the periphery. In color the patches are usually of some shade of brown, and more especially of the lighter tints, but in some rare instances, as recorded by Tillbury Fox and others, the color has been a deep brown or black; while in the colored races Lutz has observed and pointed out that there is a greyish-white discoloration, being caused by the layer of fungus preventing refractive changes. Itching is seldom complained of to any great extent, but in some cases it is rather decided. Relapses are of common occurrence.

The disease was first demonstrated to be of parasitic origin by Eichstedt, of Greifswald, by whom the characteristic fungus—the Microsporon Furfur—was discovered. It is mildly contagious, but persons may remain in close contact for years with one so affected without contamination taking place, as for instance husband and wife may never contract it from one another. Age or sex play no part either in its production or continuance, as the disease has been witnessed in about equal proportion in males and females, and it has been met with as early as six years and as late as fifty or sixty years of age. Proper remedies will influence the disease very quickly, but every point must be removed or we shall soon be confronted with a fresh outbreak.

The differential diagnosis may at times be rather difficult if every point be not taken into consideration. Syphilis, although not resembling it to any great extent, may at times be the incorrect diagnosis. But in syphilis you have a lighter color of brown, a patch that is never raised, without any scaling, and without enlargements of certain glandular structures; while in tinea versicolor we have a patch which is scaly, or if this be not apparent, a slight scratch over the surface will soon produce it, a patch that is more or less permanent, with distinct edges and a very much darker color. Chloasma and vitiligo are changes of pigment—the first an increase, while the latter is its entire loss. Papular conditions, such as seborrhœa corporis, should not be mistaken for this affection, because, firstly, of their papular nature, while in fact they have a reddish, distinct and raised border. Pityriasis maculata et circinata has a distinct and raised border, and one which is peculiar to itself in that it gives the impression of a pinkish red color, is rounded or rolled, while the lesion has a depressed centre with a pinkish color, thus showing its distinctness. Erythrasma is caused by a different parasite, the microsporon minutissimum, and is a disease confined to places where contiguous parts rub together. If confusion should occur in the mind of the practitioner, resort to the microscope will clear matters quickly and satisfactorily. The fungus is plentiful and may be collected by simply scraping the surface with a sharp-bladed knife, cleansing with ether, adding a slight quantity of liquor potassa or acetic acid, and placing upon a slide and examining with a high power, when you can readily see the small, grape-like bodies in a bunch, as it were, with the rod-shaped pieces scattered throughout the field. The fungus is said to grow rather slowly and is found to be much larger than those found in ordinary tinea tricophytina.

Ordinary bathing will be quite sufficient in the majority of cases to prevent

the spread of the disease, but in those who are uncleanly the disease is likely to progress with impunity, and in this latter class the treatment will be more difficult than in the more cleanly. The sapo mollis or the sapo viride of the Germans will suffice in many cases to cause a cure in a short time, but care must be exercised in the application, as they may cause very decided irritation and suffering. Likewise, they may cause a ruffling of the skin and thus assist in the extension of the disease. Mild remedies will generally suffice, provided the person will give it the attention directed, but if by chance one single small spot remains, the disease will return in very short order. The clothing must receive attention. It must be thrown away, if possible, because it is almost impossible to rid it of the fungus. If it is impossible to dispense with these articles, especially the underclothing, they should be thoroughly washed in a solution of bichloride in water and allowed to dry for several days before being worn again. The outer clothing may be placed in the oven, covered with brown paper, and baked for several hours, and then allowed to stand upon a rack for a few days. Hyposulphite of sodium—one dram to the ounce of water—applied freely several times a day, will often remove the affection in a few days. Resorcin—twenty-five grains to a half-ounce of some ointment base—will give a like result in many cases. Of the sulphur preparations, it is possible that the sublimed powder, in a strength of one dram to an ounce of petrolatum, will give the best effect. Thymol and napthol, either of which in strengths ranging from two to ten grains to the ounce of lanolin, will often prove sufficient. Salol and salicylic acid, using from ten to thirty grains of either to an ounce of ointment base, has proven of service in my hands.

In applying any of the above-mentioned preparations it will be advisable first to give a bath and to make your application, and then placing a clean suit of underwear upon the affected person—this suit to be worn for a week at least—so that the treatment will incorporate itself into these garments and thus keep up their effect while the patient is asleep, for instance. After one week's treatment the person is allowed another bath and a change of undergarments, and then upon your examination you may be unable to detect any diseased portion, but it will be better that a few days' treatment should be persisted in until you are reasonably sure that every point has been removed.

Children's Hours of Sleep.

One of the most fruitful sources of the illness of children is the habit which some parents have of allowing them to stay up unduly late at night. It is one of the greatest mistakes of those who have charge of them to let them have too little sleep. It is confessedly a difficult matter always to get little ones to bed at the time they ought to go; they, of course, plead for only a little longer to stay up; but if parents would only realize the extreme importance of plenty of rest they would remain obdurate to all such entreaties. It should not be forgotten that children are naturally wakeful in the morning, and in consequence of having to be off to school betimes are frequently called before they have finished their morning nap. Children, as a rule, ought to sleep ten or eleven hours, and to do this they ought to be put to bed early enough at night so that they may have this amount of uninterrupted sleep. If children do not get the necessary amount of rest it is no wonder that they become nervous, fretful, and difficult to manage. Their nerves, inherited in many cases from dyspeptic parents, are keenly alive to every sound.

Dr. Parville relates the following facts: If a can of milk is placed near an open vessel containing turpentine, the spell of turpentine is soon communicated to the milk. The same result occurs as regards tobacco, paraffine, asafœtida, camphor, and many other strong-smelling substances. Milk should also be kept at a distance from every volatile substance, and milk which has stood in sick-chambers should never be drunk. The power of milk to disguise the taste of drugs—as potassium iodide, opium, salicylate, etc.—is well known.—*Gaillard's Medical Journal.*

FRACTURE OF THE HUMERUS COMPLICATED WITH INTER-CONDYLOID FRACTURE EXTENDING INTO THE ELBOW JOINT, IN A PARALYTIC.

JOHN B. CRANDALL, M.D., STERLING, ILLINOIS.

George L—— was born in Canada, of American parentage. His father died of traumatic tetanus at the age of sixty-five years; on his mother's side there was hereditary tubercular consumption.

The subject of this report is said to have enjoyed good health in early life, with the exception of rheumatic fever, which was contracted from exposure while in the army. He made a good recovery without any enlargement of joints or other permanent objective lesions. Sometime during the year of 1880, he is said to have felt a tingling and numb sensation in the right foot, gradually extending to the knee. In 1881, this jumped to the left side, and crept up to the knee of the opposite leg in the same insidious manner. In 1882, the numbness covered like areas in both legs. In the winter of 1882, while in the act of smashing a small store-box for fuel, with his feet, his shoes being on, he injured his right foot and ankle. He said he walked about for some weeks after the injury, although the foot was greatly swollen. An old resident physician was called in consultation, who informed him that the lower end of the tibia was broken straight across. At this late date I did not measure the length of the tibia, but I noticed an increased breadth of the ankle. From the description of the injury, one naturally would look for an oblique or a parallel fracture extending to the ankle joint. This, probably, was the correct situation. I relate these facts in the history of this case merely to show the length of time the bones must have been in this abnormal condition.

My immediate knowledge of Mr. L——, extends back some ten or twelve years, having attended him and his family at different times during this term. He has been afflicted with progressive degeneration of the peripheral nerves, with partial paralysis of a gradual progressive nature, with frequent diarrheas, and with general anemia.

The numbness, or loss of sensation, extends from the lower extremity to a line with the nipples. The forearm and hands are included in these numb areas. The head, face and the upper part of the chest are not involved. He has not been able to perform any manual labor for eight or ten years past. At times his disposition is quite unbearable.

I was called to see the case for an accident, August 15th, 1895. While he was getting up from a low bed he fell, striking an uncarpeted floor on his left elbow. I was called some forty-eight hours after the receipt of injury. The reason he gave for not calling me earlier was that it did not hurt him, and he thought it was only a bruise until he heard a grating sound in the elbow. The elbow was so badly swollen by the extensive effusion, hand and forearm cold, that, at the first examination, the prospects were of losing the hand and arm. All we could do was to combat the inflammation and reduce the effusion at the elbow joint, and keep up the heat in the hand and arm. No permanent splint was applied until the ninth day. I then applied a tin elbow splint of my own construction.

I had no trouble in reducing the fracture, which was at the base and between the condyles of the humerus. The external condyle was completely detached from the lower end of the humerus, and as near as we could judge, the internal was only held to the end by a small attachment. There was complete separation and an open space between the condyles. There remains a permanent separation of the external condyle from the humerus, while there is a partial union, probably ligamentous, of the internal. The grating of the fragments can be easily detected at this date, some six months after the injury, showing the

process of bone repair is wanting in this case. The effusion is taken up, and the natural warmth can be maintained by keeping the hand and arm encased in wool. At present I have the arm put up in a starch apparatus, lined with sheep's wool.

When not steadied by the splint, the hand is in a state of semi-pronation; can open and close the fingers. There is not so much contraction of muscles as in a case where the parts were normal before injury. The results were more favorable than were considered possible early in the case. I had not been called until thirty-six to forty-eight hours after the receipt of the injury, and, mean, time, as the arm was without sensation-the patient had flexed and extended the elbow, letting the fragments grate and tear the soft tissues so there was an enormous effusion, probably from some torn blood-vessel that came in contact with the rough edges of fracture while in motion. At present he can open and shut the hand; not much strength in hand, in fact there was not much use of the hand before injury. I have ordered an apparatus like those worn after excision of the elbow-joint.

No history or objective symptoms of specific disease were present.

A DOCTORS' WAR.

The London correspondent of the Philadelphia *Telegraph*, under date of January 29, 1896, writes:

"Amid the dangers and troubles that have beset great Britain since the commencement of this year, it is at least some consolation to find that the Ashantee expedition has been brought so easily to a successful issue. As a nation, and, so far as war is concerned, England has the reputation of being a good fighter but a bad organizer. If we read Wellington's dispatches or a history of the Crimean War, our want of organizing capacity in such matters stands manifest. Nevertheless, it must be admitted that the Ashantee campaign has been admirably organized. This success stands out in all the greater relief when compared with the miserable fiasco of the French army in Madagascar. While the French will have lost not far short of five thousand men from disease in Madagascar, the English have not yet lost fifty men. There is not the slightest doubt but that the terrible loss of life in Madagascar might have been prevented had the French known something of the geography of that island and taken the necessary precautions. Indeed, and even to the very last, the French military officers resisted all the efforts of the medical staff to provide proper accommodation for the sick. In Ashantee, on the contrary, the English, from the very first, understood that it was a doctors' war, and far more care was bestowed on the medicine chest than on the ammunition wagon. Events have proved that quinine tabloids were far more useful than ball cartridges. This reminds me that it is to an American chemist that we owe the medical facilities now afforded for travelling in such countries as Africa. It is also an American journalist, Mr. H. M. Stanley, who first familiarized the British public with these innovations. Every drug was in tabloids, mixed with quick solvents; every department was well stocked with essentials for doctor and surgeon. The tabloids, being almost as small and light as a homœopathic medicine, can easily be carried over rough, roadless countries, where it is absolutely necessary to reduce luggage to a minimum. Thus the medicine chest and the portable pocket-books, containing in the smallest space a large assortment of conveniently packed drugs made up as tabloids, are now extensively used by travellers. It is to our increased knowledge of medicine and to these improved methods of preparing medicines that we owe the great saving of human life realized in this last expedition to Ashantee.

Myriads of our fellow creatures have perished because those around them did not know how to feed them.—*Fothergill.*

COMMUNICATIONS.

DIETETICS IN THE TREATMENT OF DISEASE.*

R. J. GRIMES, M. D., BETHEL, N. C.

In considering the many tragic scenes daily enacted upon the broad stage of human action, if I were asked to designate one of the most potential factors, powerful in production of death, hideous as a cause of disease and unhappiness, and wonderful in some cases even to drive men to suicide, I should unhesitatingly answer that improper food, or the continual ingestion of such food as could not be properly digested and assimilated, is as fully able as anything to fill this unevitable position.

In this assertion I need not include alcohol, for even this, methinks, pales into insignificance when compared with the enormous effect produced by the above recited evil. In the one case the monster proceeds noiselessly, melancholy attends its footsteps and even the observant physician in many cases fails to recognize its footprints. In the other the mighty demon raises his shaggy head and brazen face aloof and his effrontery effects such conspicuousness that no one can fail to perceive the evil-doer.

The premises would justify quite a thesis, nevertheless I shall not essay to do more than to present a few desultory outlines of this important subject which has been forcibly suggested to my mind as they occur in my daily practice.

In reference to childhood, it would be difficult to overestimate the importance of this subject. What a pity! Yet it must be said that many millions of these little victims die yearly because of mother's love; the suffering of the babes intensify this love, and with frantic effort she endeavors to administer to every want, too weak to withhold the action which causes the green monster to enter the household.

In the writings of no less personages than Drs. Barthez and Cummings, and others of equal celebrity, the authors declare that they meet with such success in the raising of motherless children by the intelligent exhibition of pepsin and proper diet, that they now rarely advise a wet nurse. Armed with such authority as this, I do not fear criticism when I assert that in my opinion the mothers of our land would be astounded could they know the number of deaths on account of their lack of a proper understanding of the subject.

Everyone knows how hard it is to raise the little child bereft of its mother's breast. If it is true that these little sufferers can be saved according to the excellent authority above mentioned, how can we longer doubt that the many millions of deaths from diseases caused by a lack of understanding of this subject, are but ruthless and alarming facts, which should be prevented in a civilized land.

The writer has vividly in his mind now a little sufferer, which he saw a short time since, which forcibly illustrates the fact. I found the child terribly emaciated and suffering with the worst case of ascites I ever saw. The child, five years of age, presented truly a pitiable spectacle. Her mother stated that she and her father had assiduously administered to the wants of the child for eleven months, both day and night; that she had tried the doctors until she had entirely lost all hope, and they too had added to her despondency by stating that they could not cure the child. After a hasty examination of the vital organs, I made the surprising announcement to the mother that the child's condition was simply the result of a treatment at her hands which she was then administering in my presence, viz: The child had both hands filled with candy, besides an abundance of fresh pork which it was then eating from the hands

*Med. Soc. of North Carolina, 1895.

of the mother. The child made a hasty recovery to the astonishment and great delight of the family.

It would be well here to notice the investigations of Epstein and others, who have conclusively proven that the amount of peptone formed in the stomach of the child is almost nil. Accepting this as a fact we can appreciate the importance of administering pepsin to the child, not only in the disease, but also in health as well. More especially when food is administered other than milk.

In order that we may fully appreciate the importance of this subject, we might with profit notice the physiological and anatomical relations of the alimentary canal. In the normal condition we find the small intestine wonderfully and delicately arranged. The contents fully digested and in a liquid state, trickles slowly and evenly through the intestine by gravity alone. The walls are distended with healthy gases, so as to present the best possible condition for the even passage of the fluid contents over the villi that the lacteals may more perfectly absorb the chyle, which absorption is completed by the time the contents reach the ileo-cæcal valve. The arrangement of the muscular tissue, the non-sacculated appearance of the gut, indicates that it has but feeble powers of peristalsis. Hence we conclude that any solid or semi-solid in the small intestine is abnormal and capable of producing disease; and further, that should the small intestine become filled with such contents, even without impaction, the gut would not have power to relieve itself.

On the other hand, the large intestine indicates peristalsis, and is to all appearance the store-house of the excrementitious portion of the food, thereby preventing the necessity of constant defecation. The sacculi, the arrangement of the muscular tissue in bands, the ileo-cæcal valve to prevent backward movements of the excrement during peristaltic action of the large gut, all show the powers of the gut to empty itself of its semi-solid contents.

From the above observation we may easily recognize the importance of dietetic regimen in the treatment of disease, how detrimental it is for badly digested food to pass as a foreign body over the inflamed villi of the small intestines and, contrary to nature's laws, to enter the large intestines without extraction of the chyle, which decomposes and engenders poisonous gases with their attending ills.

For fear of the criticism that I am theorizing, I will delineate as briefly as possible the following laparotomies which I performed a short time since, which seems to confirm the above conclusions.

The first patient was seen on Saturday evening, suffering with occasional colic. During the night he grew very much worse, and on Sunday morning he began to vomit, and all the signs of acute bowel obstruction rapidly developed. By 1 o'clock his condition grew so alarming that it was apparent to all that the patient, without speedy relief, must die. At 1 o'clock I operated and found the gut loosely filled with grape-seed for about eight inches above the ileo-cæcal valve. There was no impaction, and the obstruction was easily removed. I found the gut distinctly discolored and highly inflamed. After the operation diarrhœa set in so intensely that no one thought the patient could possibly live.

I found in the second patient complete bowel obstruction of six days' standing, during which time she had suffered intensely. I operated and found the bowels obstructed with several bands on the exterior of the gut, and notwithstanding the length of time, the bowel was of normal color and no inflammation. The patient was at once relieved of her suffering and in twenty-four hours had a normal action from the bowels.

Here we have, in the first instance, a very recent case with a foreign body loosely filling the small intestines, producing inflammation in twenty-four hours sufficient almost to cause death. In the second patient no abnormal contents within the gut. The obstruction being on the exterior, with six days of intense suffering, with bowel of normal color, resulting in immediate relief. These two patients seem to indicate clearly and forcibly the danger of indigestible food passing down the small intestine.

Before concluding this paper, I desire to sound a warning note with as much

emphasis as possible against the indiscriminate and reckless use of milk diet. I am willing to accord to milk diet a mission of usefulness that it would be difficult, if not impossible, to fill by any other known substance. Nevertheless, I must insist that there is a time when this mission of usefulness not only ends, but becomes a factor of detriment and a vast deal of harm.

Inasmuch as milk contains all the elements necessary to sustain the tissues of the human body, and being nature's prepared food, we can easily see how the profession may be deceived in its enthusiasm as to merits of such a diet. At the same time we should remember that it is nature's diet for the young. Besides, when we notice the change which takes place in the digestion of the adult and the development of powers of mastication, it would seem to indicate that the adult needs a diet other than milk. Only a few years ago it was thought and generally accepted by the profession that in sterilized milk we had a diet calculated to cure many cases of disease previously considered incurable. However, after the wave of enthusiasm had died away, it was proven by Leeds and Davis that such a diet was not only detrimental to the infant, but that the child so fed actually suffered a slow process of starvation.

It has been proven by Van Norden that milk is badly assimilated in the adult, at least not so well as in the infant. Dr. Emmerich Hertzka has proven conclusively that in the absence of hydrochloric acid, milk would ferment as well in the stomach as in the intestine and is therefore contra-indicated; and further, that in severe forms of flatulence in disease preceded by severe diarrhœa, gastric dilatation or atony of the stomach, milk is not well borne.

Dr. White, of Guy's Hospital, has found in his observation of milk diet in Bright's disease, that milk is difficult to digest. He says he has noticed in patients fed upon milk diet, that it tends to dilate the stomach and causes constipation; and further, that the theory that milk is less irritating for the kidneys than an ordinary diet, and that it contains fewer toxins, comes entirely from study and not from the bedside; and again he says that nothing is more striking than the alteration which takes place when a patient who has a feeble circulation from cardiac failure or bronchitis, and has been on milk diet for some time, is put on an ordinary diet.

My own experience certainly corroborates the observations above stated and I feel quite sure that I have saved not a few lives by watching carefully the effect of milk diet.

In considering the rationalé of digestion and assimilation and the wonderful anatomical and physiological arrangement of the alimentary canal for the perfect consummation of this wonderful phenomenon, I decline to believe that anyone would be so rash as to insist that milk in a clabbered state can pass with impunity over the diseased and inflamed mucous membrane of the intestine. Such a condition existing, I have seen most striking and wonderful improvement in the patient simply by stopping the milk diet and followed by a single dose of calomel and a diet of decoction and soda crackers.

Only a short time since I saw a patient almost in a moribund state who had been sick ten days, and fed with one quart of milk daily, with clabbered stools. Simply by following the directions above stated the improvement was so striking that I could hardly realize it. In another case, under similar conditions, the improvement was as equally wonderful, but in this case the patient took within twenty-four hours one tablespoonful of milk, which quickly caused a relapse, and the family became very much alarmed. However, I informed them that the patient would soon be convalescent—as soon as I could relieve her of the milk, which was true.

I have no faith in pasteurized or boiled milk, and have found that pure, fresh, raw milk is incapable of improvement except by the addition of pancreatin, in above cases an alkali, and in cases of infants to stimulate the milk of the mother as much as possible.

Van Norden has proven conclusively that milk can be most satisfactorily assimilated when the stomach digestion is entirely excluded. Hence we can understand that the addition of pancreatin would be beneficial, which is also abundantly proven by Dr. Solis-Cohen at the bedside.

CURRENT LITERATURE CONDENSED.

Inguinal Hernia with a Peculiar Complication.[1]

Six weeks ago I was asked by Dr. Carter to see a child one year and three weeks old. The day before I saw it the child had what was supposed to be an attack of dysentery. There was considerable vomiting, the passage of frequent muco-sanguineous discharges from the bowels, and fretfulness, with evidence of severe pain. The mother, upon examination, found that an inguinal hernia, which she had been accustomed to reduce without trouble, had descended, and could not be reduced. The family physician saw the case next morning, and I saw the child with him two or three hours later. The child was in bed, with legs drawn up, abdominal walls rigid, and a large tumor of the right side of the scrotum with œdema of the tissues covering it. Herniotomy was at once performed. The sac was found very thick and containing little fluid, if any. I pinched it up carefully and split it open, and was somewhat surprised to find that I had the appendix vermiformis, protruding from the posterior wall of which was an ordinary brass pin, the head being within the appendix and the point sticking out. The sac contained, in addition to the appendix, the cæcum and nothing else. I removed the appendix, returned the cæcum, removed the sac, and closed the opening. The child made an uninterrupted recovery.

Case of Double Ligation of the Vasa Deferentia for Hypertrophy of the Prostate.[2]

The patient was a cab-driver, aged seventy, married. For nine or ten years he was troubled with frequent urination. Five years ago he had a sudden attack of retention with constant dribbling, which yielded to Sitz baths, rest, and catheterization. Afterward involuntary dribbling from over-distention troubled him at times, and frequency was greater than it had been before. Two weeks ago he was attacked similarly, and after five days' treatment as before was sent into the hospital. The prostate was symmetrically enlarged to about the size of a billiard-ball. After about three weeks' rest in bed with regular catheterization, the patient showed no improvement. Ten minims of a four-per-cent. solution of cocaine were injected into the tissue around the spermatic cords, close to the external abdominal ring. The vasa deferentia were separated to the extent of an inch from the cords, and double ligatures of fine silk were placed a quarter of an inch apart on each vas. The vas was not severed. The wounds were sutured and the usual iodoform dressing applied. For seven days after the operation all urine was drawn as before. On the seventh day, about two drachms passed voluntarily. Improvement continued, and the patient reports himself feeling better than during the last ten years. I frequently test the amount of residual urine, and find it to vary from three and one-half ounces to two ounces. The prostate is about the size of a duck's egg.

Is There a Rampoldi's Sign?[3]

Rampoldi calls attention to a transitory, but recurrent, unequal dilatation of the pupils as an early and almost constant symptom of the ordinary form of pulmonary tuberculosis. This is due to irritation of the sympathetic to the nerves of the iris. At the last International Medical Congress, Destree read a paper in which he stated that he had found this sign in ninety-seven per cent. of cases of pulmonary phthisis, and has later affirmed that it is the swelling of peribronchial glands which causes the pressure referred to, and that he had confirmed this by autopsies. Recent investigations have shown that the peribronchial glands are infected very early in pulmonary tuberculosis—are probably the first tissue invaded.

Treatment of Ulcers of the Leg.[4]

The first step in the treatment of a varicose leg-ulcer is to paint the ulcer

[1] W. O. Roberts, M.D., *Archives of Pediatrics*, January, 1896.

[2] F. Tilden Brown, M.D., *Journal of Cutaneous and Genito-Urinary Diseases*, January, 1896.

[3] Casey A. Wood, M.D., *Medicine*, January, 1896.

[4] S. S. Halderman, M.D., *Columbus Medical Journal*, January 7, 1896.

and surrounding skin with a solution of nitrate of silver (gr. xx to f℥i). I next cover the ulcer and adjacent skin with chalk ointment, spread evenly on cotton or linen rag. This ointment containing a large quantity of prepared chalk, forms the best kind of an artificial crust and is made by adding to the chalk barely sufficient lard to make an ointment. This requires about one pound of lard for three pounds of chalk, and, as thorough and complete trituration is essential, it cannot be made in less than an hour. The final stage is the application of a domette flannel bandage. The condition calls for powerful and well-applied pressure, and without a proper bandage all other efforts will fail. Little disturbance of the applications is necessary; at first the quantity of the discharge may require the frequent removal of the dressings, but in a little while this will be wholly unnecessary, and our object should be to maintain the mechanical integrity of the chalky incrustation. I would lay stress on the fact that in treating ordinary cases of ulcer of the leg, proceeding from any cause, there is no necessity for any rest of the limb at all. The proper use of the well-bandaged limb is not only no bar, but an actual help toward its cure. For very indolent ulcers I combine with the ointment, oil of tar (℥i to lb.i), to be applied until the character of the ulcer is changed. It is needless to say that mercury and iodides are called for in syphilitic cases. The greater number of these cases are benefited by the use of strychnia and arsenic.

A Case of Sudden Death from Air Embolism Following Attempted Abortion.[5]

A married woman, twenty-seven years old, the mother of two children, had a miscarriage at three and one-half months, one year ago. One morning she was found unconscious in bed, with her feet on the floor. Some water was given her, but she was unable to drink, but commenced to froth at the mouth, had a "spasm," and died in a few minutes. One week previously she had informed her mother that she was pregnant. A much battered linen catheter, No. 10, with the stilet *in situ*, was found in the folds of her dress, but no syringe, water, nor anything of that sort was found.

On opening the body, small tuberculous foci were found at the apices of both lungs; the remainder of the lungs congested. The abdominal organs macroscopically normal. The veins of the mesentery and omentum contained blood separated by clear spaces, the columns of blood varying from one to three centimeters in length. Pressure on the vessels caused these clear spaces to move to and fro, carrying the blood with them. The same appearance was noted in the gastric and coronary veins, but not in the vena cava nor pulmonary artery. On grasping the heart it felt resilient as though grasping a rubber ball but partly filled with air. On incising the right ventricle the cavity was found filled with a mixture of blood and air, which frothed out at the opening. The blood seemed thoroughly churned up with air, and the clots were neither numerous nor large. The auricle also contained a quantity of this frothy blood, but the left side was empty and the heart itself normal. The uterus was fifteen centimeters long and contained a male embryo about ten weeks old (eleven centimeters long). There was no hemorrhage in the vagina, but the uterus contained a small quantity of blood. The membranes were perforated, and were separated on the right and anteriorly over an area of four and a half by five centimeters. The right ovary contained a recent corpus luteum. It seems unlikely that the victim introduced the catheter unaided, but evidence of an accomplice was not obtained.

2 Louis J. Mitchell, M. D., *Medicine*, February, 1896.

The Relation of Intestinal Irritation and Absorption to Neurasthenia.[6]

Among neurasthenic patients the symptoms of the condition known as intestinal indigestion are very common. The passage of mucus is especially common, but rarely mentioned, unless inquired for. In some patients it occurs periodically, and much relief follows the passage of large amounts.

The rugæ of the colon, unlike the val-

1 Arthur Sweeny, M. D., *Northwestern Lancet*, February 1, 1896.

vulæ conniventes of the small intestine, are produced by the longitudinal muscles. My attention has been called to the collection of masses of scybalæ in these pouches even when the patient claims that the bowels are regular. These masses appear to be held more or less firmly by the spasmodic contraction of the muscles, the liquid stool passing the obstruction without removing it. It is my custom to give such a patient an enema containing two grains of extract of hyoscyamus and one-eighth grain of stramonium at night. This is to be retained and causes relaxation of the muscles. An enema of a quart or more of warm soapsuds is administered next morning, the patient being in the Sims' position and then assuming the knee-chest position for five or ten minutes.

It is commonly a surprise to the patient to find in the stools, after this, from forty to fifty hard masses, often covered with grayish mucus, which had been retained perhaps for weeks. The explanation of this is overstimulation of the splanchnic nerves, resulting in contraction of the longitudinal and relaxation of the circular fibres, and due to absorption of products of putrefaction. The urine affords a valuable index in these cases. Normally indican is shown to be present in small quantities, but in these cases the reaction often shows deep violet or orange and black.

The indications for treatment are to relieve the intestines of the poisons and irritating materials; to favor elimination by the various organs; and to prevent and neutralize the poisons by appropriate medication. The first of these objects I achieve by the use of the hyoscyamus and stramonium followed by the soap and water the next morning, or by half a pint or a pint of cotton-seed oil. These must be continued for some weeks. Cathartics increase the trouble and glycerine enemata seem valueless. General hygiene, and particularly exercise, assist in elimination. Condiments are to be avoided, but it does not seem possible to do much good by strictly limiting the diet. Charcoal and naphthalin seem to meet the third requirement. Calomel and iodoform are very efficient but are also objectionable on account of the constitutional effect of the one, and the odor of the other.

Nervous Affections Caused by the Poison of Gout.[7]

It is only of late years that we began clearly to recognize the importance of the poisons generated in the body. The poison which has longest been thus recognized is uric acid, and its relationship to gout has long been known. Haig has recently pointed out that the amount of uric acid found in the urine shows only how much is being excreted, not how much may be retained in the system, and therefore does not vary in exact proportion to the amount of nitrogenous food ingested. The poisonous effect is of course due to the amount retained. The metabolism of our own muscles steadily forms uric acid, but this amount is little modified by even considerable exercise, and the kidneys readily excrete it all and accumulation would be practically impossible were it not for the nitrogenous food taken. The opinion largely prevails that a nourishing diet means a meat diet, yet the necessary supply of albuminoids can be readily obtained by a vegetable diet, as was well shown when the Union Pacific Railroad was built. In this case the great muscular labor was performed by Chinese coolies, living almost exclusively on vegetables. The reason that this ingestion of uric acid is not generally recognized as a cause of disease is that the liver, kidneys, and skin promptly excrete much of it, and a great deal is stored in the tissues, not making its presence felt for some time. Uric acid keeps the arterioles in a state of high tension, resulting in hypertrophy of the heart and of the arterial walls, and though the full, hard pulse and florid face seem to indicate the reverse, the tissues are receiving less blood, the kidneys secrete less, and the patient approaches an "attack of gout." Haig states that the high tension is always accompanied by a slow pulse, excepting "if the heart fails before the high tension we shall get palpitation or a quick, irregular pulse instead of a slow one." In this he is in error. It is of frequent occurrence that high tension is associated with palpitation in a strong heart. The palpitation of a weak heart is aggravated by exertion. The palpitation of gout occurs with a strong heart

[7] David Inglis, M.D., *Medicine*, February, 1896.

and occurs independently of exertion, at times being continuous, at times coming on suddenly while the patient is sound asleep or quietly reading. In other cases the poison is, as Haig states, a cause of bradycardia. Angina pectoris is another result of high arterial tension, often due to gout even when a cardiac murmur is to be heard. In many cases the murmur will appear and disappear, the disappearance being due to lessened tension from rigid attention to diet. Eye-strain is perhaps the most common cause of migraine, but the majority of cases not due to eye-strain may be traced to gout. Hypochondriasis, melancholia, and epilepsy often seem due to the same poison. An elderly person feels a numbness in one leg and arm; it passes off quickly, leaving no vestiges; from time to time it recurs, always on the same side. There may be with it a similar transient motor paralysis. The condition seems due to spasm of an artery, probably already contracted. Another form of nervous gout is peripheral neuritis. The poison causes neuritis of all grades.

A CHINESE DOCTOR.

"When I was acting American consul at Amoy, China," said Mr. W. E. Fales, "one of my employees fell sick with a severe attack of rheumatism. He stood the pain bravely for three days, refusing all 'foreign devil medicine,' and on the fourth sent for a native physician. The latter duly arrived and began preparations for treatment of the malady, which he announced to be due to the presence of a 'darting snake' in the sufferer's body. Incense-sticks were lighted and placed just outside the door, and also in the room. A pack of fire-crackers were set off and a talismanic paper pasted to the wall. This was done to drive away evil spirits and attract good ones.

"The doctor next wrote a lot of characters on a thick piece of paper with a vermilion pencil and set fire to it. It burned into a black ash, which was broken into a cup of water and drunk by the patient. A great bowl of herb tea was made, of which a cup an hour was the allotted dose. The son of Æsculapius next bared the body of my servant, and drove deep down into it at nine points a long needle moistened with peppermint. He did it with such skill in avoiding large blood-vessels that the hemorrhage was insignificant. He then covered each acupuncture with a brownish paste, and this in turn with a piece of dark paper. He then collected his fee, fifty cents, and departed.

"The sufferer soon fell into a sleep, and the next day announced that his pains had departed. He remained in his bunk two more days, laughing, chatting, smoking cigarettes, and once or twice using the opium pipe, and then reported as being well. He left the paste and paper in place until they fell off. The skin was smooth and the scar hardly perceptible. He took his recovery as a matter of course, his only comment being that the darting snake was thoroughly dead.—*New York Recorder.*

A young typewriter had just been hired by a prominent lawyer. She had never done regular work before, and was somewhat nervous.

The lawyer settled himself back in his chair and began dictating from mind a brief. He had pegged away about five minutes when the girl stopped, with a horrified look on her face.

"What's the matter?" asked the lawyer.

"Would you mind saying that all over again?" the girl asked, with eyes full of tears.

"Why?"

"I forgot to put any paper in the machine."—*Syracuse Post.*

"Why is it," said Mrs. Wilbur to the ragman, "that you don't buy old paper any more?"

"I saves money by subscribin' direct for the Sunday newspapers, ma'am," said the ragman.—*Harper's Bazar.*

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PHILADELPHIA, SATURDAY, FEBRUARY 22, 1896.

EDITORIAL.

A FRESH ATTACK ON MEDICAL EDUCATION—A STAB IN THE BACK.

We are interested in a renewed attack on higher medical education in New York. The matter is not one in which our sympathies merely are enlisted, as would be the case if the REPORTER were limited to a clientele of Philadelphians, or even of Pennsylvanians. But the issue is one immediately involving many of our subscribers, and indirectly affecting the welfare of the entire American medical profession, to which the efforts of the REPORTER are dedicated.

After several years of hard work, the better class of the New York profession succeeded, in 1893, in securing practical and successful, though not ideally perfect, supervision of both the matriculating medical student and the graduate applying for a license. The law, as amended in 1895, requires, for the present, a trifle more than a common school education, with a gradual raising of the matriculation standard so that the graduate in medicine in 1900 must have had a full high-school course. It is upon this provision rather than upon the subsequent examination in strictly medical branches by a state board, that we place emphasis. Impartial and thorough execution of the provisions of the law is secured by placing all examinations under control of the University of the State of New York—an institu-

tion which is not a university in the ordinary sense of the word, but is a state commission with the power of examining students of all grades, of distributing funds for the maintenance of school libraries, of encouraging university extension courses, of amassing statistics concerning education, and, in general, of supervising and unifying the entire educational system of the state.

The enactment of the New York law, reasonable, or rather inadequate as it may seem, was bitterly opposed. It had the editorial and society support of most of the state, and a few of the better colleges worked for its adoption. Against it was arrayed the venomous though often concealed hatred of the diploma mills, the organized agitation and petitions of medical students, and the wide-spread jealousy of some of the old practitioners who felt that requiring a decent education of their students was a reflection on their own ignorance, sanctified as it was by years of practice.

Two or three times since the passage of this law, attempts have been made to modify its virtues or to delay its enforcement, but the vigilance of its friends and the good sense of legislators have thus far prevailed. The present attack is of the most insinuating and specious kind. It is entitled, "An act to provide for four years' study of medicine and attendance on four regular courses of medical instructions of not less than six months each at legally incorporated medical colleges, preliminary to receiving the degree of bachelor or doctor of medicine." Yet careful reading shows that either by adroit wording, by the omission of explicit provisions for enforcement, or by the customary section repealing conflicting legislation, the existing reforms are completely nullified, everything is left to the honor of individual schools, the increasing standard of the present law is reduced to a non-enforceable requirement of a little more than a grammar-school education, and the operation of the proposed law is delayed to graduates of the year 1900.

The Reporter has repeatedly stated its views in regard to medical education: Briefly it is more essential to build solidly the foundation, than the superstructure. It believes in wisely increasing the duration of medical study up to the point where serious students, who seek our profession with no sordid motives, find that the practical limitation of preparatory work compels them to choose between thorough general education and medical training. It holds that ultimate success in our profession depends upon the former rather than the latter, and cites, as proof of its opinion, the men of eminence in medicine to-day, the great majority of whom graduated from two-year schools but have enjoyed a liberal education. We may find many well-educated men who have attained only mediocrity, but we rarely find eminence without education, and the exceptions are either specious or are explained by the presence of a phenomenal intellect which can develop without scholastic training.

The puny child of four may be absolutely stronger than the robust infant of two; the ignorant boy who has attended a four-year medical school may be a better doctor than the well-educated graduate from a two, or even three-year school. But in a few years, preliminary training tells as certainly as does physical vigor, and the mark reached by the physician of ten or twenty years' standing is not to be guaged by his medical instruction but by his subsequent mental growth.

The Reporter trusts the prompt rally of the friends of medical advancement in New York State, will serve to ward off the treacherous attack upon the standard they have so nobly raised.

VIEWS AND INTERVIEWS.

Ominous for the future of Philadelphia as a medical center is the utter indifference to its representative organizations manifested by the local profession. The REPORTER has suggested a fundamental cause for this indifference in the lack of foresight and of ordinary enterprise on the part of the organizations themselves, as demonstrated by the neglect to acquire or even to encourage the simplest but most powerful of all engines of progress—a press distinctively representative. A press representative, not in the form of mausolean archives—such are provided in the "transactions" annually published by the societies—but in the form of popular periodicals which will keep current work constantly in evidence, and thus maintain and enhance the interest at home and abroad. Medical newspapers, if you please. Avenues for constant communication between living men, considering living ideas and dealing with living issues. In fact, journals such as represent all progressive communities with aspirations for the advancement of the science of medicine.

* * *

Curiously enough, this conservative hypokinesis is not the cause generally assigned by individuals for personal indifference. At least it is not that most frequently heard in answer to inquiries made by the REPORTER among the local profession. It is to be remarked in passing, that these responses have come principally from the "rank and file" of the profession; that is to say, from average physicians, active practitioners whose point of view is the necessity for associations and opportunities productive of practical benefit in the every-day exercise of their profession. The queries were put to such, rather than to men whose views were liable to the bias of peculiar individual relations, for the reason that the profession is made up of average physicians, and because the determination of Philadelphia's future standing in medical science rests ultimately with the local profession as a body. It is to be noted, furthermore, that these opinions were not sought in immediate connection with this discussion, but have been gathered casually, as opportunity presented, for several years past, during which the REPORTER has devoted considerable study to the conditions obtaining in medica Philadelphia.

* * *

Factional domination is the operative cause of Philadelphia's decline as a medical center. Such appears to be, in brief, the conviction of the greater portion of the profession; an estimate not calculated upon institutional data. Individual opinions find expression in a variety of forms more or less specific and emphatic, but factional domination comprehends the essence of them all. Factional domination, however, is a condition not peculiar to Philadelphia. Faction exists wherever opinions differ, and is inseparable from popular forms of organization. Factional domination may anywhere be alleged against those in power by these who may not, but are ambitious to obtain control. The REPORTER is not inclined to admit faction to be superlatively the cause. It is true Philadelphia is grievously infested with factions. Unquestionably, the profession is divided into numerous independent cliques, and upon lines utterly unworthy of the reputed embodiment of modern American medicine. The influence attained by concerns comparatively insignificant is, however, made the more apparent by the lack of common interests which would assure the subordination of petty affairs in an united effort to advance the common welfare. The remarkable number of small associations and petty coteries in the city is sufficient evidence of the prevalence of faction.

* * *

It must be admitted that medical Philadelphia has suffered much from a cabal which presents some peculiar features. But the controlling element in this city is by no means a homogeneous faction. It is rather a congeries of cliques, which by juxtaposition present combinations as unexpected and grotesque as the figures in a kaleidoscope, and, like the parti-colored bits of glass, they shift about and commingle between common (and transparent) limits—institutional allegiances.

No faction, within the ordinary meaning, could achieve such power and retain it for so long a time as has the oligarchy thus contemned for squandering the ancient glories of

Philadelphia medicine. It is the predominance of institution rather than the domination of faction, which is clogging progress and steadily reducing Philadelphia to inferior rank among American medical centers. The wellnigh dictatorial power exercised by institutions has so long been a fact granted, that it would be stultifying to demonstrate it. No intelligent one with any degree of information would hesitate to affirm it true.

The institutions in no respect are to blame for accepting every opportunity to promote their individual interests and to gain all possible advantages. They should not be shorn of strength and reduced to the level of other interests. All other interests should develop their innate powers and grade up to the superior plane achieved by the medical institutions of Philadelphia. With other elements as creditably developed, the influence of the institutions will no longer be inordinate, but they will retain their proper relations in due proportion to their importance as factors of a future medical center, as truly pre-eminent as has Philadelphia been in the past. It can be done. It must be done, or Philadelphia is hopelessly out of the contest for medical supremacy.

CORRESPONDENCE.

IS INSANITY CONTAGIOUS?

EDITOR MEDICAL AND SURGICAL REPORTER:

Is insanity contagious? The question I am forced to ask from the standpoint of personal experience; the answer would seem to interest every single individual, as well as the profession *en masse*.

For the last two years it has been my great privilege to be resident with and constantly thrown in intimate relation with a case of paretic dementia, and I have almost hourly, observed the progress of the disease, and as well, undoubted symptoms of infection in the patient's wife. We will not say infection from a *microbic* or a *neurotic* origin, but from a *psychical influence*—mind over matter. May it not be? Weaker minds are impressed and influenced by stronger ones.

The wife of this patient (whose family history was good) is about seven years younger than himself. She is small, delicately constituted, and having a collegiate education, taught school as principal for five years previous to her marriage. She was twenty-five when married in 1889. In 1891 the husband had *la grippe*, followed by neurasthenia. He was confined to the house for six months. Since then he has been suffering with all the symptoms of chronic meningo-encephalitis, viz.: change of disposition; failure of memory; mental exaltation; delusions of grandeur; tremors; easily provoked to furious outbreaks; speech slow, hesitating and indistinct; appetite voracious—he will eat two and three courses, then ask if there is not more dessert. He has Argyll-Robertson pupils, and spells of unconsciousness resembling *petit mal*. He has failed to respond to *all* treatment, including potass. iodi, and hydrarg., and is gradually growing weaker in mental caliber and in his general gait.

Now the point I wish to emphasize is this: The direct parallel of this case is developing in this man's wife. Since his removal to a private asylum six months ago, there is shown in his wife: change of disposition; outbursts of passion; mental exaltation; insomnia; inordinate appetite; gastric crises; Argyll-Robertson pupils. This patient responds to medicinal treatment more readily than did the husband, and seems to improve under radical treatment.

I ask for discussion of this subject, or for any information of value.

R. A. C. PEEPLES, M.D.

Dreshertown, Montgomery Co., Pa.

"Traveler: 'May I take this seat?'"
"Maiden (from Boston, icily): 'Where do you wish to take it, sir?'"

ABSTRACTS.

THE CARE OF THE TEETH.*

H. A. KELLEY, D.M.D., PORTLAND, MAINE.

The two diseases that carry off the very large majority of the teeth are *caries* (decay of the tooth substance), and the conditions induced by the formation of tartar:—not the *discolorations* upon the teeth, but the hard substance incrusted there and only removable by the scaler.

Defective cleanliness is the practical cause of caries. The frequency of caries is due to a variety of conditions, one class intrinsic and the other extrinsic. Intrinsic conditions are incomplete development, deficient nutrition or the mal-position of the teeth. These defects, by lowering the power of resistance, open points of easy attack by the disease.

These then are predisposing conditions in contra-distinction to all extrinsic agencies. A crowded condition, or irregular position of the teeth, predisposes to decay by forming spaces which favor the accumulation and retention of fermenting and acid-forming remains of food.

Many of these irregularities are entirely due to preventable causes, as the too early, or still more often too late, extraction of the first teeth. The *chief cause* of *decay* is the chemical change produced by minute organisms in the fermentable matter lodged upon and between the teeth. Caries is therefore of two distinctly marked stages—first decalcification or softening of the tooth substance, and secondly, dissolution of the softened residue.

The decalcification is accomplished by acids derived almost entirely from the starchy and saccharine substances. Fermentable albuminous substances, as meat, etc., develop but small quantities of acids. The dissolution of the softened residue is accomplished by bacteria and their excretion. In a scientifically clean mouth there can be no caries. The preventive measures must consist in freeing the mouth, as far as possible, from these organisms; since one cannot confine the diet solely to albuminous substances which give rise to alkaline and not acid products.

Of course thorough cleansing cannot be effected where cavities of decay are present in the teeth. The mouth is a most favorable incubation chamber for the growth of bacteria since there is constantly recurring a supply not only of the organisms, but of the materials on which they rapidly multiply, as well.

So prolific are they that if the dental toilet be neglected for a day or two the mouth will contain more of them than there are people in all Europe.

We have thus learned something of the nature of the disease and its causes.

How far have we its causes under our control? Very largely.

First, what can be done as to diet and its effect upon the teeth. Something may be accomplished here, I think but little.

Yet it is well worth while to see that our bread is not *too* fine and that *some* of the wheat remains, and as it is well known that the teeth, as well as all the other organs of the body, demand exercise we can get these two results by eating some hard crackers made of the whole of the wheat. Common hard-tack (the real stuff, not pilot bread so called) is good and so are the crackers known as Educator crackers. By repeated thorough systematic cleansing of the oral cavity and teeth, to so far reduce the amount of fermentable matter as to materially diminish the production of the acid; by prohibiting the consumption of such foods as rapidly undergo fermentation, and lastly by a proper and intelligent use of antiseptics to destroy and limit the number of bacteria and

*Jour. Med. and Science, February, 1896.

their activity, the ravages of decay may be largely counteracted or limited. Mechanical cleansing exercises a great influence and should be performed daily after meals and *invariably* after the last meal of the day or before retiring.

Even if most faithfully used a tooth-brush cannot alone produce a clean mouth. It must be followed by waxed silk passed several times between each two teeth. Little rubber bands answer the place of the silk very well. The importance of this cleaning between the teeth is apparent when we realize that only in the fissures of the molars (due to faulty structure) do we find decay more prevalent than in these surfaces. If one starts with clean teeth, they may be kept fairly clean by the use of the tooth-brush, water and silk floss. A tooth-powder is pleasant but not necessary, though I advise the use of a simple powder, as it polishes the teeth. Be sure your powder *is* simple and avoid all those that "whiten the teeth, prevent decay, harden the gums, etc." If they are what they should be, for ordinary use, they have no such properties.

A medicated tooth-powder may be necessary in some cases, but if so let your dentist prescribe it. Finish your cleaning by washing the mouth with an antiseptic, and I know of nothing better for general use than Listerine; a spoonful in half a glass of warm water.

I would give more for one thorough cleansing, such as I have described, just before retiring for the night, than for a course of forty times a day as the operation is usually performed. When you have done this you have done about all that you can do yourself in the care of the teeth except to regularly consult a dentist for examination. For, however skillful you may be, you cannot yourself discover cavities as soon as they should be located. As to how often these visits should be made I can only say experience in your own case can only determine it. Many of my patients I see of necessity once in three or four months; others do not need an examination oftener than once a year.

As for the care of the conditions due to the presence of tartar, you can yourself do I think I might say nothing; it is so little.

It is a very distressing disease and one that demands the greatest skill of the most skillful dentists, backed by the greatest care of the patient. If you are troubled in this way your dentist will treat you and give you the course of treatment that you yourself are to use. With these ideas I leave the first part of my subject. I have quoted quite largely from a paper upon "Tooth Preservation," read by Dr. Cunningham at the World's Columbian Dental Congress.

I have said thorough cleaning cannot be effected where cavities of decay are present in the teeth, and this introduces the second part of my paper. But I would not have you think that it is not until cavities of decay appear that the dentist appears, even although it is so in this paper. Fortunately the dentist is called in before the tooth is sick.

I can say but little of the care of the teeth by the dentist. What I wish to say is in regard to what he can do to prevent the necessity of his *operations*. I mean the necessity of his filling, extracting and supplying lost teeth.

What can *he* do to prevent the two chief causes of the loss of the teeth as we have seen them to be. In the first place he can lecture his patients as I have lectured you to-night, and as I cannot do, see that you heed his instructions. Then he must be able to differentiate between a sick tooth and a well one, if I may so term them. I mean by a well tooth, one that demands nothing but a filling (that any kind of a filling will save), and a sick tooth is the opposite (one that needs treatment). It may occur to you a tooth that needs filling is already sick.

Much can be done to save such sick teeth if your dentist is skillful.

If his method of choosing a filling material is a mental deduction of whether you are able to pay for a gold filling or whether he had better insert a plastic, on account of its cheapness, of course, his mind being busy with that heavy reasoning, he cannot spare the time or brains to think which will more perfectly preserve the tooth. I repeat, the choice of filling materials has much to do with the *saving* of teeth; and in this connection, let me give you an axiom in dentistry, "in proportion as a tooth needs *saving*, in that proportion keep a gold filling out of it." Much

can in this way be done to improve the teeth and especially the teeth of children.

Careful examination is another important thing. Owing to the careless way in which examinations are often made, cavities are not discovered until the tooth has reached the sick stage. This oversight is sometimes not avoidable, as, if the teeth are placed close together it is difficult to examine all the surfaces without separations and this is not practicable.

But at least when a suspicious place presents if we cannot surely determine the condition without wedging, wedging should be done. Cleansing is far too often imperfectly done by the dentist as well as the patient.

Cleaning should not merely consist of brushing over the anterior teeth to make them look well. As time and lots of it is required for the patient to clean his own teeth so it is when the dentist does it. Would you believe a dentist would fill all the cavities in a person's mouth, rub their front teeth until they were as clean and white as could be, and yet leave the root of each tooth almost covered with tartar, and discharge that person as in a thorough condition for six months! I had a case like that a very short time ago and the patient could not sleep nights—no, not mind trouble but actual pain, and the dentist could not discover what was the cause.

Irregularities, even those that are not unsightly, should be corrected when they cause a condition favorable to disease, and finally instruments should be kept clean and aseptic that disease be not carried from one mouth to another. All these the dentist can do in caring for the teeth and more.

There is one more subject in the care of the teeth that I wish to spend a few moments with, something in which wealthy or well-to-do men and dentists are equally interested in, the care of the teeth of the poor.

If you could stand in some dental offices a day and see the teeth, of at least average goodness, that are thrown away by the poor, the teeth that many of you would give dollars and dollars for, you would say something ought to be done to stop it.

That these teeth are sacrificed, is due to two causes—ignorance and poverty.

The dentist has ignorance, or no care for the welfare of man, and the patient has ignorance and poverty.

So far as I know, there is not a *charitable* dental hospital or infirmary in this world. Of all the money that we spend in the care of the poor hardly a cent is spent for the care of their teeth.

Here and there a hospital has a dental surgery department (it is invariably but an extracting room), and our dental colleges give the services of their students to the poor. And while I will admit that this student service is better than that they obtain from the average dentist they in their ignorance and poverty would consult, still it is not true charity we thus extend to them.

Supposing that in the operating room of this Infirmary and that of the Maine General Hospital the operating was done by the students of the Maine Medical School, and that the medical wards were also under the same students, would you consider you were doing all the community should do for the health of the poor? Could not a great deal be done in this city in saving the teeth of the poor and in instructing them in the care of their teeth, and *the value of their teeth to them*, if we had a Dental Infirmary presided over by skillful dentists?

Feeling as I do about this matter and fresh from my work among the poor of Boston (I mean my work as instructor of operative dentistry at Harvard, where I had an opportunity to observe the services given to the poor by the ablest student body in this world, under very competent instructors), I could not keep the idea out of my head that something ought to be done in this city for the poor man's teeth.

When we take the care of the morals, the education, the sustenance, and the medical and surgical necessities of the poor, does it not seem we ought to have some care of this most important part of the body,—the teeth?

"Excuse me, sir," said Barker to a boorish traveller, "but what is your business?"

"I am a gentleman, sir. That's my business."

"Ah," said Barker. "I see. You are taking a vacation."

A NEW THEORY OF SLEEP.

Since the discoveries made by Golgi, Cajal, Retzius, and others of the peculiar anatomical characteristics of the nerve-cells a number of new theories regarding brain-function and brain-action have been in the field. The nerve-cell, as it is now understood, consists of a very large number of long branched processes, which are called the protoplasmic processes, and a single axis cylinder which extends out, becoming eventually the nerve-fiber and giving off fine lateral branches. It has also been shown that each nerve-cell in the brain is in contiguity with some other nerve-cell, or rather with the terminals of the axis cylinder process of that cell, but that no actual union takes place between the processes from the one cell and fiber process of the other. When one set of nerve-cells, for example, are thrown into activity, impulses are sent out along the axis cylinders and their terminal end-brushes, and these effect by contact the protoplasmic processes of other cells.

Some time ago Professor Duval proposed the theory of sleep based upon the peculiar relations of the brain-cells and fibers. According to this theory the nerve-cells in repose retracted their processes, which, as he thought, were really pseudopods. The cell processes being thus retracted, the contiguity of the cell with other cells was less perfect, hence their functions became lowered, consciousness was lost, and sleep ensued. Kölliker objected to this view, on the ground that amœboid movements are never observed in nerve-cells, at least of the higher animals; Duval having contended that he had seen such movements in the lower order of animals. Cajal, siding with Kölliker, states that no matter what way you kill an animal —by shock, strangulation, or anæsthesia —the nerve-cells never differ in aspect, and one never can discover any amœboid movements among them, even when they are placed freshly in the field of the microscope.

Cajal has, however, suggested another theory of sleep which he believes more rational and more in accordance with facts. While nerve-cells do not have amœboid movements, there are, scattered richly throughout the brain-tissues, other cells known as neuroglia cells. These are cells with very numerous fine processes, and they form in a large measure the supporting framework of the brain-tissue, sending their fine processes in among the nerve-cells and blood-vessels. Now Cajal's theory is that these neuroglia cells during repose extend or relax their fine hair-like processes. As a result of this the perfect contact between the processes of the nerve-cells and the end-brushes from axis cylinders that surround them is interfered with, hence the brain function is slowed up and sleep ensues. During activity these neuroglia cells retract their numberless fine processes, the contact between the nerve-cells becomes perfect again, and mental functions are resumed. The practical facts upon which Cajal bases this ingenious theory are that the neuroglia cells are found to be in different states. In some their processes are retracted and shriveled and in others they are extended. There is unquestionably an amœboid movement, therefore, in this class of cells. Furthermore, it is in accordance, he says, with physiological facts that a cell would retract its processes during activity and relax them during repose. The physical basis of sleep, therefore, according to this view, would be the bristling up of the hair-like processes of the neuroglia cells, a squeezing of them in between the machinery by which the nerve impulses pass, and a sort of a clogging of the psychical mechanism.—*Med. Rec.*

Manuscripts to right of him,
Manuscripts to left of him,
Manuscripts in front of him,
  Sorted and numbered.
How he stared on them,
While the light flared on them;
  And his wife wondered
What he would do with them,
What he would know of them,
When he got through with them,
  Through with six hundred.

J. W. Carr, in Journal of Education.

"ONLY CHILDREN'S DISEASES."

When a child is brought to a physician for treatment, the careful examiner asks: "What diseases has he had?" The usual nonchalant reply is: "Only children's diseases;" as if measles, scarlet-fever, mumps, whooping-cough, chicken-pox, and diphtheria were as much a matter of course as the shedding of the first teeth. Vain error! Any acute infectious disease is always a real disaster, a misfortune which has overtaken the child. If well developed and naturally strong, he may escape without lasting injury. On the other hand, permanent damage may be done to special parts of the organism, or general weakness may be induced that renders him a ready victim to grave constitutional disturbances later. All communicable conditions of illness are due to a special poison of greater or less virulence, and the attack itself is destructive according to its severity.

The acute infectious diseases of childhood, "only children's diseases," are often followed by serious nervous disorders. Acute Bright's disease is another common result. For five years and a half Dr. Agnus Bluhm kept a strict classification of all cases of this affection that came into the medical clinic at Zurich, and found them to be its chief cause. The deafness due to scarlet-fever is only too well known. Chronic lung trouble sometimes follows measles and whooping-cough, and whooping itself causes an average of about ten deaths every week in New York. Chicken-pox, considered the merest trifle, is often a serious affair, and little children do die of it. The poison of mumps may also do great harm; and all infectious processes are capable of damaging internal structures to such an extent as to render their full development and perfect function almost impossible.

What shall be done, since children's diseases present such latent possibilities of evil? First, keep the child from all contagion if it can be done. The best time to have measles, etc., is no time. Sunlight, fresh air, and perfect cleanliness are preventive measures. Never allow a child to associate with others suffering from communicable disease. In some parts of England persons allowing those who are well to associate with members of their family suffering from the effects of contagious poison are fined. This is as it should be. No one has any right to spread poison. If, in spite of eternal vigilance, some communicable disease does appear, isolate the child. And for how long? The nature of the disorder, the symptoms, and its course must decide this. The time is always longer than parents and guardians think necessary. Generally speaking, it is two, three, or four weeks for measles, three to four weeks for diphtheria, two months for whooping-cough, and from six weeks to two months for scarlet-fever. Occasionally a diphtheria patient has to be isolated for twelve weeks. About three is the usual time. The child may then be far from well, though the special poison may no longer be present on microscopic examination. It is against the law for persons suffering from acute contagious diseases to appear in public.

There is one exception to this statement. Whooping-cough is not yet under the inspection of Boards of Health. This oversight is bound soon to be remedied. In the meantime there is the moral law and the golden rule.

Contagious disease germs are always with us. To be a source of danger they must find a soil suitable to their development and rapid multiplication. Such exists in neglected garbage, in defective drains, contaminated wells, and damp houses. Owing to their unsavory origin, diphtheria, measles, etc., are called filth diseases. Were all cellars, drains, garbage, etc., properly attended to they would eventually disappear, like the great plagues of Europe, also due to dirt and neglect. The vital question of the hour is: What is your duty about communicable poisons, about disease germs?

Let us make for righteousness in this matter, each according to ability, obeying strictly the law whenever it exists, and doing unto others as we would be done by in every instance. The disorders under consideration are all known to be perfectly preventable. Shall we prevent them?—*Christian Adv.*

PERISCOPE.

MEDICINE.

Spinal Puncture.

Furbringer (*Deut. med. Woch.*, November 7, 1895) refers to a few cases in which no fluid could be obtained by him, although there was every reason to think that the needle had entered the dural sac. In one case the puncture was made as many as fourteen times. He relates the following case in an infant aged five and a half months, which was admitted with fever, stupor, marked opisthotonos, and bulging fontanelle. Only a few drops of fluid could be obtained by spinal puncture, although, contrary to his usual practice, he employed aspiration. At the necropsy, in addition to distention of the cerebral ventricles, the pia mater at the base of the brain was converted into a dirty yellowish-white mass with numerous tubercles in it. The same condition was noted in the spinal cord. The dural sac was distended, not by fluid, but by this œdematous spongy material. There was evidence that the needle had entered the dural sac, but had not injured the cauda equina. The negative result was due to the absence of fluid. Among the author's three or four negative cases, there was one case of uræmia without necropsy. Furbringer has obtained by spinal puncture 50 and 90 c.cm. of fluid respectively from two cases of uræmia, but in one case, where only a few drops could be obtained, there was no fluid found after death.

Influenza.

De Renzi (*La Clinica Moderna*, December, 1895) says it is now possible to say that there can be no infection without Pfeiffer's bacillus. According to Pfeiffer, this micro-organism is only present in the bronchial secretion. It may be found in the sputum even after it has undergone some degree of desiccation, but the moist secretion is the chief medium of transmission. The influenza bacillus has also been found in the lungs in influenzal pneumonia; but it is possible to have a secondary infection there, as by the streptococcus or diplococcus. Influenza may be divided into the nervous and catarrhal forms, but these forms may be combined. Unlike other acute diseases, a disproportion may exist between the temperature and the pulse, the former being high, while the latter is infrequent. The most common nervous symptoms are intense headache, often having the character of hermicrania. It is especially situated in the forehead, in and behind the orbit, and in the temple. It is occasionally as severe as in meningitis. Pains may be present in other parts, as in the course of the nerves, in the joints and muscles; they are aggravated by movement. The pain referred to the nucha is, in the author's opinion, so frequent as to be almost characteristic. At times the most grave nervous symptoms may be present simulating meningitis. Sometimes influenza produces a true meningitis or an encephalitis. Prostration is most constant. Occasionally mental affections appear during convalescence; they are usually of short duration, and end in recovery. Neuritis is sometimes seen. Some neuroses—as hysteria, neurasthenia, epilepsy, chorea—have followed influenza. Various catarrhs may occur in influenza. In influenzal broncho-pneumonia the prostration with rapidity of breathing is characteristic; there is but little alteration in percussion. The sputum may be blood-stained. Hemorrhages from mucous surfaces are occasionally seen. Gastro-intestinal symptoms occur. The attack of influenza is mostly short. The author advises against the use of antipyrin in influenza. He speaks highly of the use of salipyrin and of quinine. If pneumonia supervenes, considerable quantities of alcohol may be required.

THERAPEUTICS.

Hashish in Egypt.*

W. C. MACKENZIE, D.SC., CAIRO.

The word "hashish" is not unfamiliar to pharmacognosists, and some of its derivatives are interesting—assassin, etc., from "hashasin," which is the plural of "hashash," meaning one who smokes hashish. The significance of the English word and its connection with the Arabic give us a hint as to the results produced by smoking this drug.

The importation of hashish into Egypt and its growth are forbidden by the government, but the regulations are not sufficient to prevent its use on a somewhat extensive scale, and consequently there is a lively trade done in it by smugglers. Greeks are the chief smugglers, and the state of the international law renders punishment of the offenders difficult. The plant is also grown clandestinely to a small extent.

Hashish as bought from a shop (and that is easily done) is an earthy-brown substance in lumps, which may be easily broken. It is prepared by taking the small leaves and female flowers from the tops of cannabis indica, rubbing them down to a powder, putting through a fine sieve, and heating the dark-green powder thus obtained till it becomes cohesive, and then working up into lumps by the hand. It is smoked in a special pipe called a goza, having a bulb for water and two tubes, one for the mouth and the other for the bowl. It is charged first with tobacco of a strong black variety, used only for this purpose, then above the tobacco is placed a small piece of hashish, above which is laid a piece of red-hot charcoal.

* Chemist and Druggist.

The odor of hashish is very peculiar, easily recognized, and not to be mistaken for anything else.

It first produces exhilaration, in which stage, no doubt, are committed the crimes which have gained for it its evil reputation; this is followed by a dreamy condition similar to that enjoyed by opium smokers, and, no doubt, constituting the charm which tempts the hashash (as the hashish-smoker is called) to a miserable future. Insanity is a frequent result of the too free indulgence in this species of intoxication, and there are many to be seen who, having been well educated and having filled important posts, have fallen victims to the drug.

Hashish-plants grow to the height of eight feet, and are frequently one and a half inches in diameter at the foot of the stem, which is hard and woody, and which, if the plant be grown by itself, may be branching, but when grown in quantity is usually erect, with little or no branching.

The seeds of cannabis indica, although almost identical in appearance with those of common hemp, differ in having a tougher coat, which difference may be distinctly observed by taking the seeds between the teeth and crushing them. The hashish-seeds are also more flattened and sharper at the edge when cut through the middle; the section thus seen shows a dark line between the husk and the albumen, while in common hemp-seeds this dark substance is not so conspicuous or is absent altogether.

The active principle of hashish is generally supposed to be a resin, which was first obtained by T. and H. Smith; other investigators have isolated a volatile oil named cannabene (Personne), and an alkaloid, tetanocannabin (Hay). Nicotine is said to have been obtained, but that has since been denied, and some authorities say the active principle has not yet been isolated.

By distilling hashish with water in a current of steam the writer has obtained a colorless volatile oil with a most penetrating odor, identical with that given off by heating hashish in a dry test-tube. For several days the condenser-tube smelled of this oil, even though the amount was very small (1 per cent). The residue having been filtered off, the liquid on evaporation gave a residue, insoluble in alcohol and ether, equal to 6.7 per cent. The substance insoluble in water, after drying, gave 55.5 per cent. of a brown oily body by extraction with petroleum ether. By distillation this oily substance gave off, first, some colorless oil (230°C.) with a strong but not unpleasant odor somewhat resembling malt vinegar; and later, a thick, yellow substance (320°C.), the odor of which reminded one of crude shale oil. The residue, after extraction with petroleum ether, was treated in the same way with alcohol, and gave 6.5 per cent. of a brown resin, which melted at about 70°C. The residue, insoluble in water, petroleum ether, and alcohol, equaled 31.80 per cent., and contained mineral matter equal to 13.7 per cent. The composition of hashish is approximately as follows: Volatile oil, 1 p. c.; substances soluble in water, 6.7 p. c.; soluble in petroleum ether (oil), 55.5 p. c.; soluble in alcohol (resin), 6.5 p c.; insoluble organic matter, 18.1 p. c.; insoluble mineral matter, 13.7 p. c.

The Role of Bacteria in Butter-making.

Professor H. W. Conn and Mr. Wm. M. Esten, following up the investigations of Storch, Weigmann, Adametz and Wilckens (Lancet), have carried on a series of experiments on the ripening of cream for butter-making by artificial cultures of bacteria. Out of a large number of organisms separated no fewer than fourteen were used, whilst, in addition, the bacillus acidi lactici, the micrococcus freudenreichei, the bacillus katz and the bacillus schafferi produce a butter-ripening fermentation, but not so good as that obtained from the use of some of the organisms obtained from the creameries. Professor Conn maintains that if the organisms be obtained from sour cream in a dairy that has a reputation for making good butter they in turn will give good results, the converse holding good that organisms from a bad dairy will produce bad butter. The experiments with mixtures of the different organisms are not yet completed, but it is probable that by combining the action of several micro-organisms an even finer flavor may be obtained in butter made from cream ripened by these artificial cultures. Preliminary heating of the cream to 70°C. prepares the way for the growth of the inoculated bacteria, killing off most of those bacteria that are accidentally present and which often disturb the ripening process. The preliminary heating to 70°C. is of further importance from the fact that so many of the disease germs succumb when exposed to this temperature. One great advantage of this method is that the process may be made to extend over a somewhat longer period than is usually found necessary in dairy operations. In fact, it can be controlled much more accurately than the natural ripening process. The bacteria may be kept alive and active for some time, so that, a good stock having been obtained, a certain flavored butter can always be at command.—*Western Druggist*, December, 1895.

Eudoxin is a preparation made by the Rhenania factory in Aix-la-Chapelle.